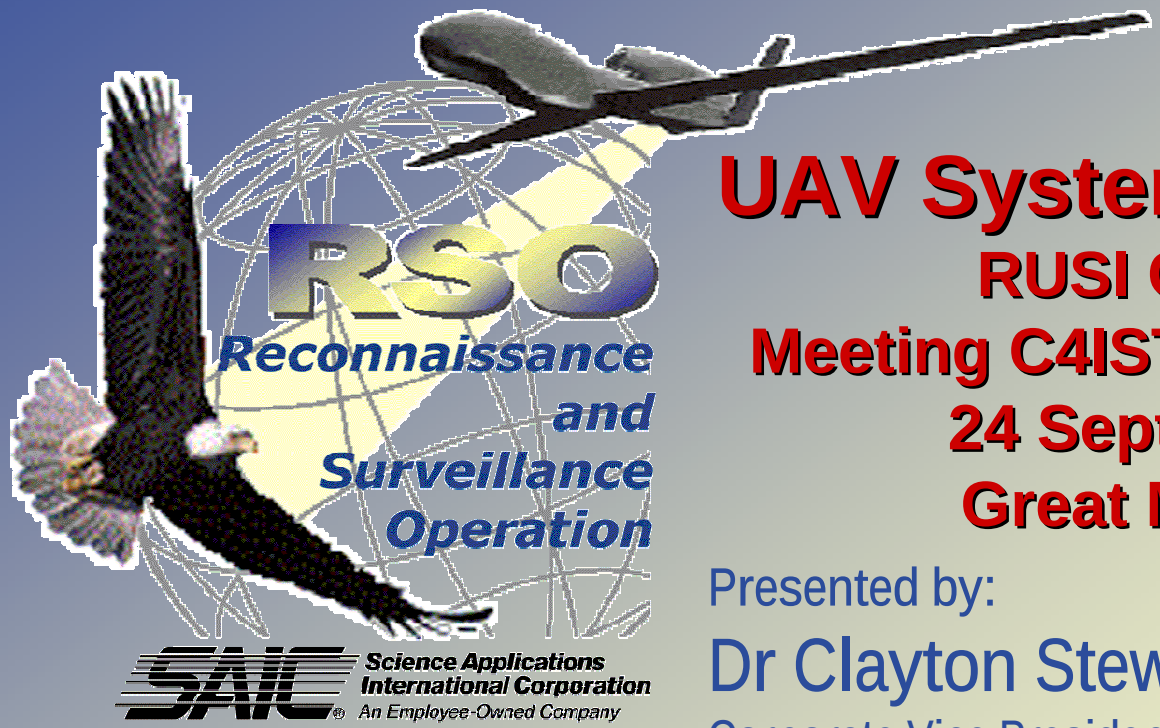

UAV Systems in C4ISTAR

RUSI Conference
Meeting C4ISTAR Requirements
24 September 2002
Great Malvern, UK

Presented by:

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UAV Role in Warfare Rapidly Evolving

Reconnaissance and Surveillance Operation

- Traditional UAV role is “Dirty, Dull, and Dangerous,” but mostly EO/IR reconnaissance
- In Future
  - Enabling dynamic LOS and OTH networks comm relay
  - Multiple (SIGINT, IMINT, MASINT, etc) sensor platforms
  - Jamming
  - Targeting
  - Real-time BDA
  - Strike/ JSEAD
  - Overwatch
  - Decoy
  - Rescue/Recovery
  - Battle Management
  - Boost Phase Intercept

SAIC Vigilante VTOL UAV

UAV Trade Space

Reconnaissance and Surveillance Operation

- Operational Performance
- Communications (Collection data link and C2)
  - Connectivity to what level?
  - Data rate
  - Analog vs digital
  - Compression?
- Timeliness
- Launch - Ease of use and tasking
- Targeting - Provide data to support attack
  - Image Quality – Interpretability
  - Target Dwell - What is the "in-view" revisit rate
- Range - What range is sufficient
- Location/Accuracy - What is target geolocation (CEP)
- Survivability
- Recovery – Recoverable, expendable or disposable
- Endurance
  - What on station time is required
- Environment/ Meteorology - Wind, altitude, rain, etc
- Tactical Mobility –
  - Man or vehicle transportable
  - Air transportability
- Interoperability
  - Who needs to know?
  - Who needs to control?
- Lethal or nonlethal
- Payload performance vs cost and footprint

COST

Current Pentagon UAV Study Findings

According to Defense News

Reconnaissance and Surveillance Operation

- UAV unit cost must be reduced drastically.
- Demand from U.S. military battlefield commanders is high.
- UAVs that have emerged from advanced technology demonstrations
  - are difficult for military logisticians to support and
  - have limited growth potential.

Key Performance Parameters (KPP)

Reconnaissance and Surveillance Operation

SAIC
An Employee-Owned Company

Payload

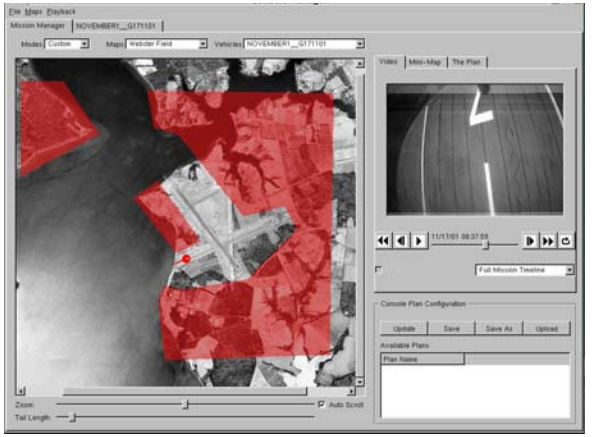
- Field of View
- Resolution
- Weight
- Weather Effects
- Bandwidth Required
- Power Required
- Size
- Cost

C4I System

- Data Link range
- Bandwidth
- C4I Infrastructure connectivity
- LPI/LPD
- Data integrity

Airframe

- Speed (Max, Loiter)
- Range
- Endurance
- Span (Max, Min)
- Vehicle Gross Weight
- Payload Weight
- Payload Volume
- Payload Power Required
- Altitude
- Radar Cross Section
- Cost (Acquisition, O&M)



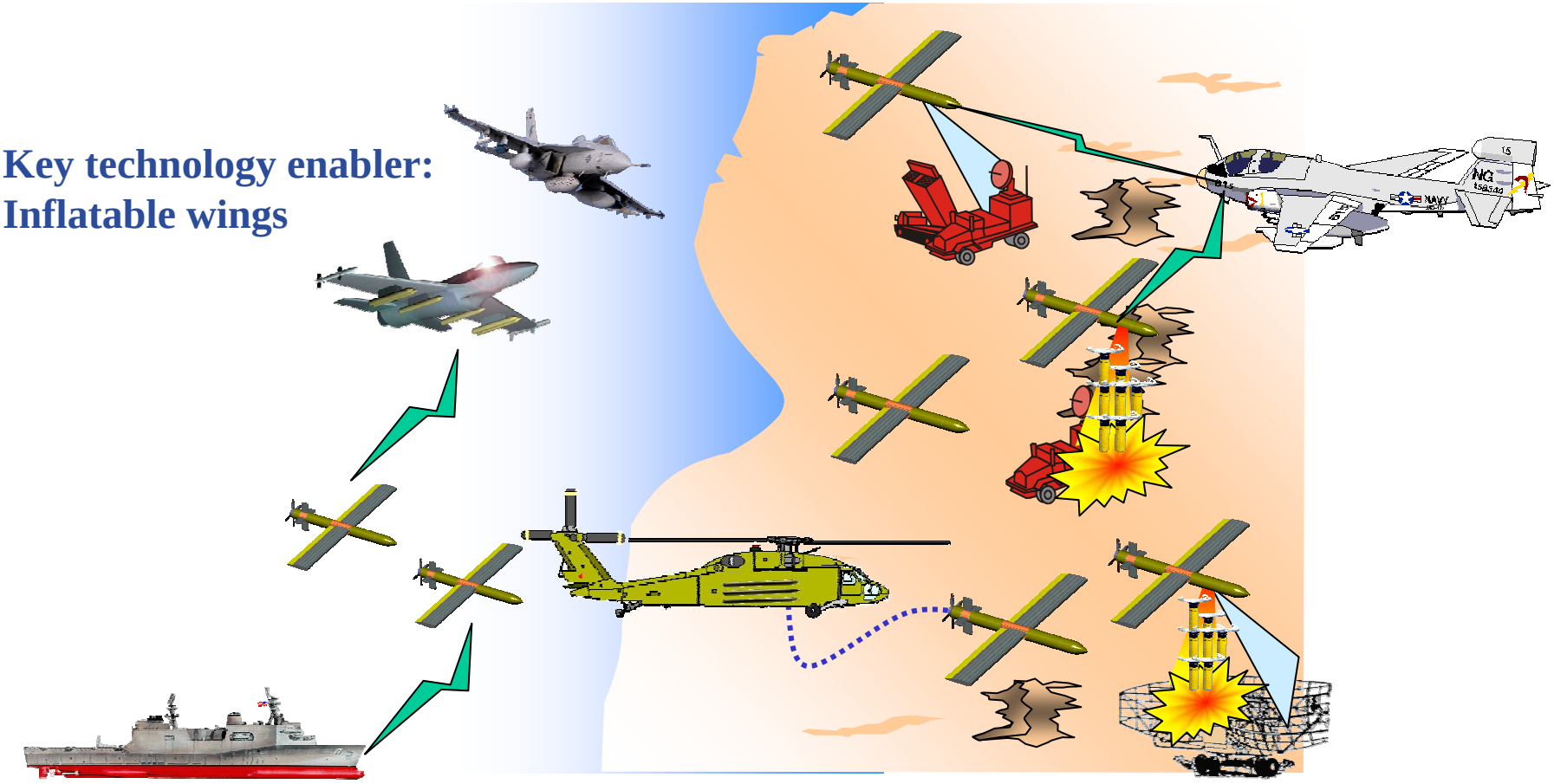
Operational

- Mission Planning time
- Launch/ Recover time
- Launch/Recover Constraints
- Time to Retask
- Imaging Rate
- Collection Efficiency
- Exploitation Time
- Manpower Required

Loitering Electronic Warfare Killer (LEWK) Concept

Reconnaissance and Surveillance Operation

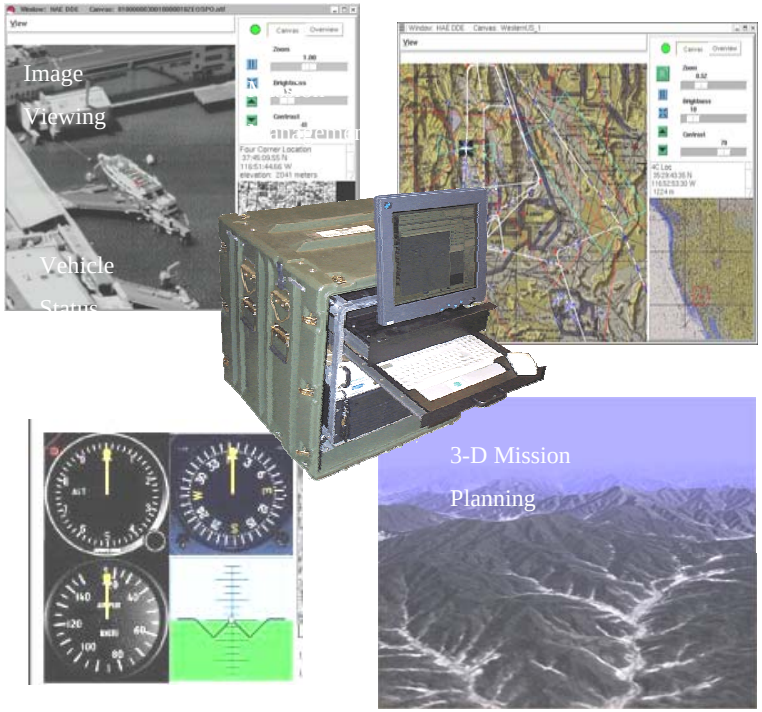
Key technology enabler:
Inflatable wings



Tactical UAV Imperatives

Reconnaissance and Surveillance Operation

Reconfigurable Ground Stations and Analysis Tools



Adaptable Processes

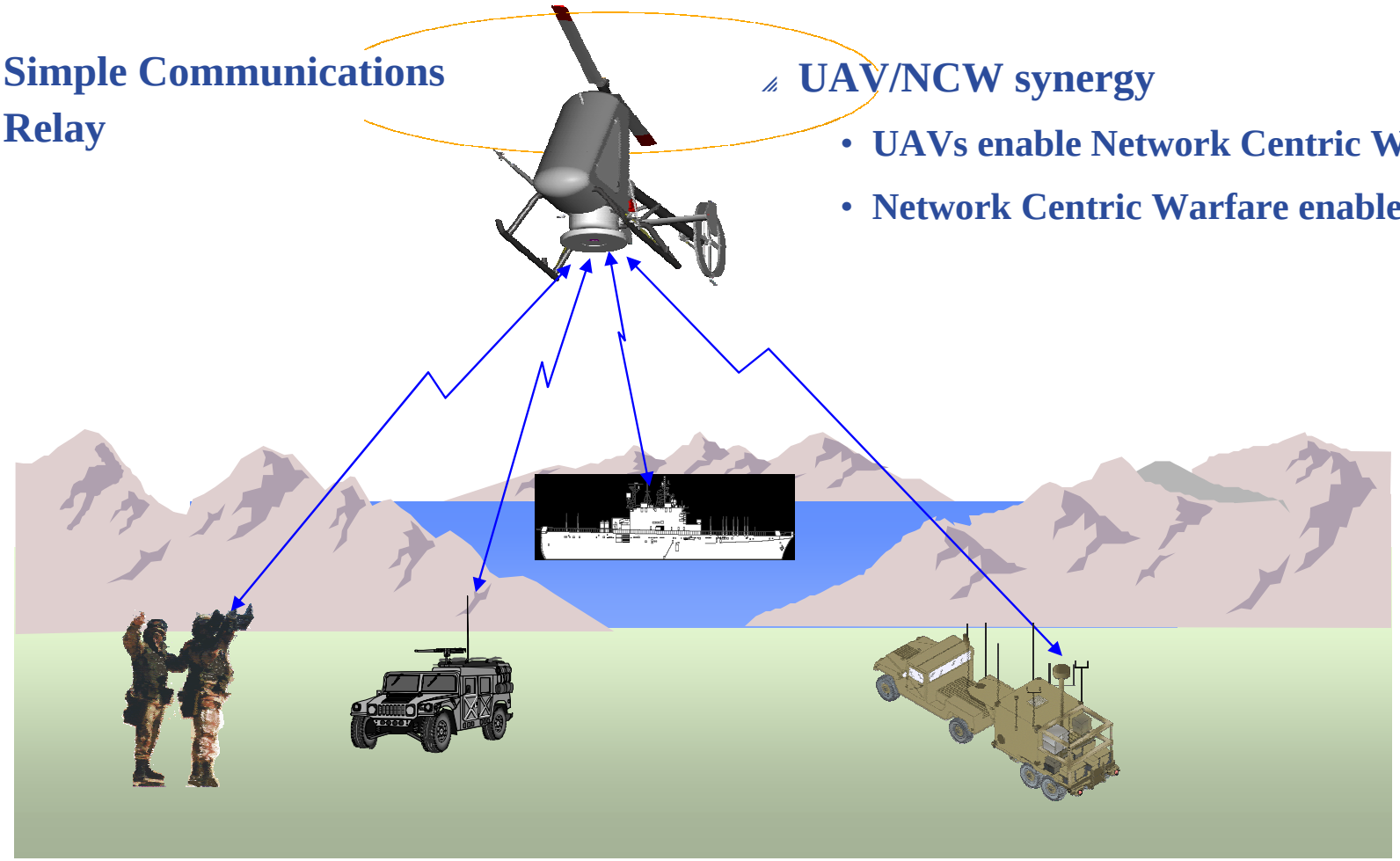
- *Rapid prototyping to meet steadily evolving requirements*
- *Low-cost system design and fabrication*
- *Integration of COTS*
- *Spiral software development*
- *Low cost material fabrication*

QuickLook and LEWK Prototypes

UAV's and Network Centric Warfare

Reconnaissance and Surveillance Operation

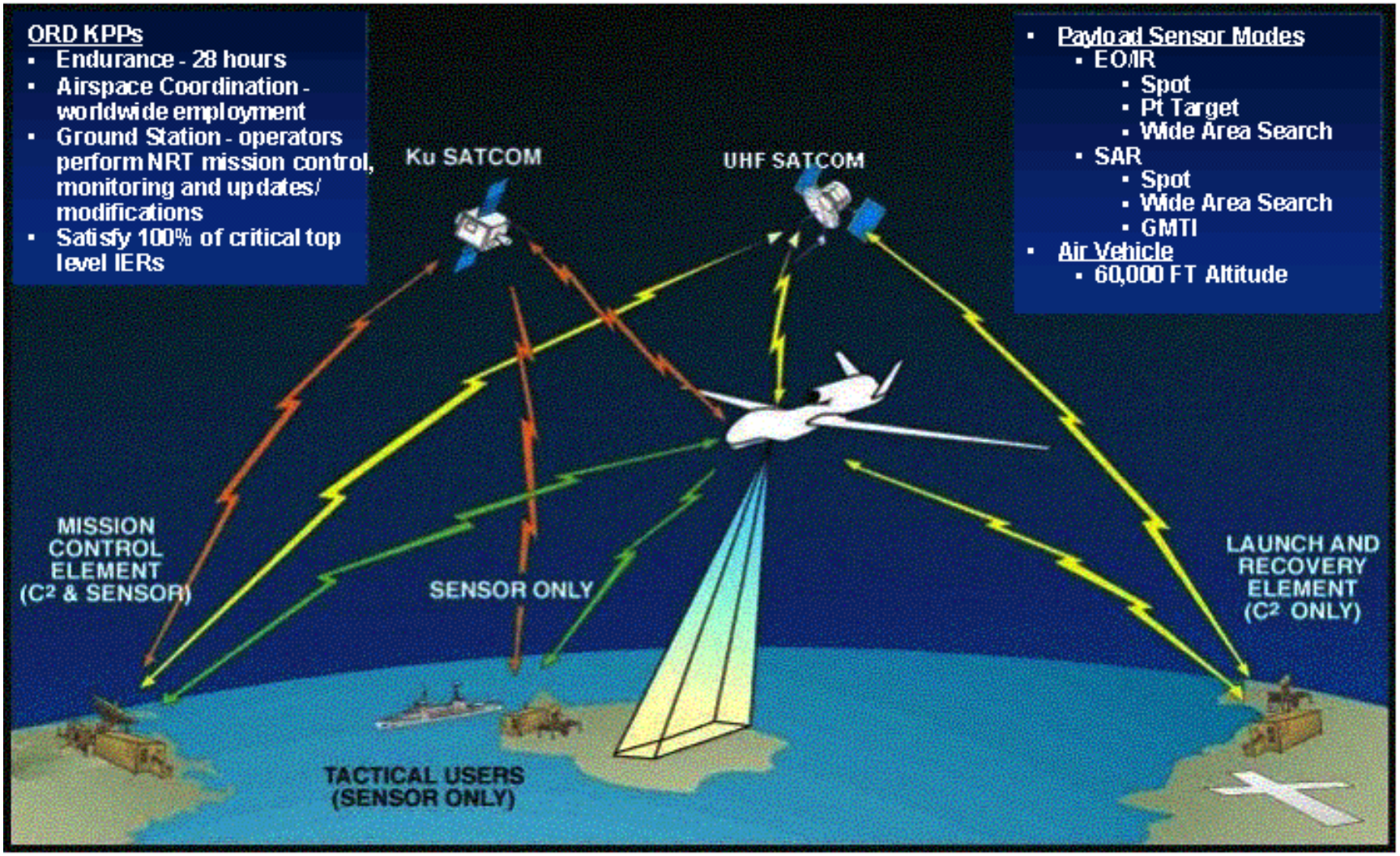
Simple Communications Relay



- **UAV/NCW synergy**
  - **UAVs enable Network Centric Warfare**
  - **Network Centric Warfare enables UAVs**

Low-Cost Dissemination and Imagery Exploitation Platform for Global Hawk

Reconnaissance and Surveillance Operation



UAV Ground Station Technologies

Reconnaissance and Surveillance Operation

64 kbps
– 6 Mbps

64 kbps
– 6 Mbps

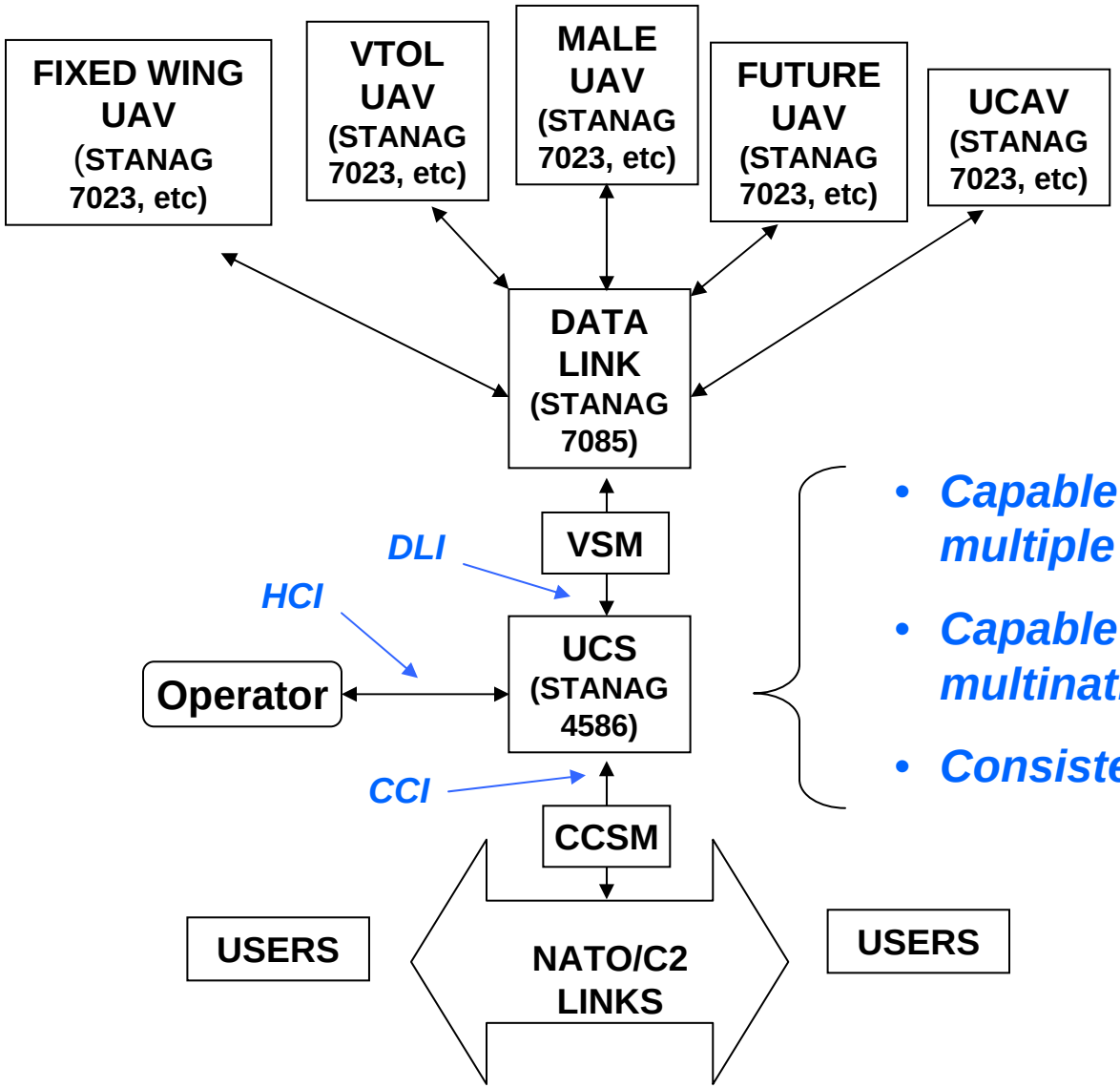
1.8m dish
8 watts

1.8m dish
8 watts

Standards Are Important

NATO UAV Control System Architecture

Reconnaissance and Surveillance Operation



- *Capable of controlling multiple vehicle types*
- *Capable of interfacing with multinational C4I systems*
- *Consistent look-and-feel*